

**REMARKS**

Applicant respectfully requests reconsideration in view of the amendment and following remarks. The applicant has incorporated claim 15 into claim 11. Support for newly added claim 27 can be found in claim 26. The applicants have rewritten claim 26 into the independent form as newly added claim 27. Claim 26 is further limited than newly added claim 27, because component (D) was further limited in claim 11, which claim 26 further depends from. The applicants have added one claim (claim 27) and cancelled one claim (claim 15). The amendment raises no new issues or consideration since the Examiner has already considered the features of claim 15 and claim 26.

Claims 11-26 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 11-15, 17, 19-22, 24-26 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-9 of U.S. Patent No. 6,489,388 ("Kurz"). Claims 11-26 are rejected under 35 U.S.C. 102(e) as being anticipated by Kurz. Claims 11-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Horio U.S. Patent No. 6,147,146 ("Horio") in view of Takayama U.S. Patent No. 6,284,828 ("Takayama"). The applicant respectfully traverses these rejections.

**Rejection under 35 U.S.C. § 112**

Claims 11-26 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant

regards as the invention. The applicant believes that the claims as amended are in compliance with 35 U.S.C. § 112, second paragraph.

The expression “white goods sector” is a technical term art and known to one of ordinary skill in the art. The term “white goods sector” encompasses household appliances, e.g. refrigerators or dishwashers. The encompassed devices are usually but not necessarily white. The following definitions are evidence that it is well known to one skilled in the art (See Appendix 1 for copies of the references).

See Marriam-Webster Online dictionary at <http://www.m-w.com/cgi-bin/dictionary?book=Dictionary&va=white+goods&x=20&y=14>

Main Entry: **white goods**

Function: *noun plural*

**1 a** : white fabrics especially of cotton or linen **b** : articles (as sheets, towels, or curtains) orig. or typically made of white cloth

**2** : major household appliances (as stoves and refrigerators) that are typically finished in white enamel

On dictionary.com two entries were found the first entry was

**white goods**  
*pl.n.*

1. White fabrics, usually of cotton or linen.
2. Household merchandise, as bed sheets and curtains, formerly made from white fabrics, but now often colored.
3. Large household appliances, as ovens and refrigerators, formerly finished with white enamel, but now often colored.

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defines **white goods** as

n 1: large electrical home appliances (refrigerators or washing machines etc.) that are typically finished in white enamel 2: drygoods for household use that are typically made of white cloth [syn: household linen]

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Searching Yourdictionary.com found the following definition:

(Pronunciation Key)white goods

White fabrics, usually of cotton or linen.

Household merchandise, as bed sheets and curtains, formerly made from white fabrics, but now often colored.

Large household appliances, as ovens and refrigerators, formerly finished with white enamel, but now often colored.

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See also enclosed EP 1312849 (abstract) and WO 2004026012 (abstract) and the three pages from the internet which use the term “white goods”. For the above reasons, this rejection should be withdrawn.

### **Double Patenting Rejection**

Claims 11-15, 17, 19-22, 24-26 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-9 of Kurz. The Kurz’s

claimed component D is defined in claim 1 as follows:

“(D) from 0 to 50% by weight of fillers, reinforcing materials and/or additives wherein the additives are selected from the group consisting of (1) stabilizers, (2) nucleating agents, (3) antistatics, (4) light stabilizers, (5) lubricants, (6) plasticizers, (7) pigments, (8) dyes, (9) optical brighteners, (10) processing auxiliaries, and (11) mixtures thereof.”<sup>1</sup>  
(emphasis added)

Claim 6 of Kurz states

The composition as claimed in claim 5, wherein from 0.1 to 5% by weight is an additive and said additive is a stabilizer.

Kurz discloses the stabilizers at col. 2, lines 43-56 as follows:

Suitable polyacetal stabilizers against the effect of heat are, in particular, polyamides, amides, for example dicyandiamide, hydrazines, ureas, poly(N-vinylactams) and alkaline earth metal salts of aliphatic, preferably hydroxyl-containing, mono- to tribasic carboxylic acids having 2 to 20 carbon atoms, for example calcium stearate, calcium ricinoleate, calcium lactate and calcium citrate. The oxidation stabilizers used are, in particular, bisphenol compounds, preferably diesters of monobasic 4-hydroxyphenylalkanoic acids containing from 7 to 13, preferably 7, 8 or 9, carbon atoms.

Examples of suitable light stabilizers are alpha-hydroxybenzophenone derivatives and benzotriazole derivatives.

The applicant's claimed component D) is

from 0.01 to 1% by weight of one or more nitrogen-containing costabilizer and wherein the nitrogen-containing costabilizer comprises at least one amino compound, amide compound, hydrazine compound, urea compound or a hindered amine. (emphasis added)

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<sup>1</sup> The numbers have been inserted by the applicant and were not in the original claim.  
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Kurz claims 1 and 6 require component (D) in a broad range (from 0 to 50% for claim 1 and from 0.1 to 5% for claim 6), compared to only from 0.01 to 1% as is required by the applicant's claimed invention. In addition, the applicant's claimed invention requires that component (D) is not only one or more nitrogen-containing costabilizer, but comprises at least one amino compound, amide compound, hydrazine compound, urea compound or a hindered amine. This is not claimed by Kurz. Dependent claim 6 only limits the additive to a stabilizer, but not to a nitrogen-containing costabilizer, let alone costabilizer which comprises at least one amino compound, amide compound, hydrazine compound, urea compound or a hindered amine (see claim 1). There are several different stabilizers disclosed in Kurz. Kurz discloses that component (D) which covers the benzotriazole light-stabilizers which are not covered by the applicant's claimed invention. The applicant's claimed invention is a **selection invention over Kurz**. For the above reasons, this rejection should be withdrawn.

### **35 U.S.C. 102(e) REJECTION**

Claims 11-26 are rejected under 35 U.S.C. 102(e) as being anticipated by Kurz. The applicant again respectfully disagrees. For anticipation to apply, every claimed feature must be taught in the prior art. Kurz does not teach component (D). Kurz' component (D) is as follows:

“(D) from **0 to 50%** by weight of fillers, reinforcing materials and/or additives wherein the additives are selected from the group consisting of (1) **stabilizers**, (2) **nucleating agents**, (3) **antistatics**, (4) **light stabilizers**, (5) **lubricants**, (6) **plasticizers**, (7) **pigments**, (8) **dyes**, (9) **optical brighteners**, (10) **processing auxiliaries**, and (11) **mixtures thereof**.”  
(emphasis added)

There are 10 different groups disclosed for this optional component. In the applicant's claimed invention component D) is not optional. In fact, in the applicant's claimed invention, it

is a specific group within the 10 different groups. Further component D) must be present in an amount from 0.01 to 1%. This range is included in the range from 0 to 50%, but this range is not taught by Kurz. The applicant's claimed component D) (one or more nitrogen containing costabilizers) in an amount from 0.01 to 1% was not recognized by Kurz. The examples in Kurz did not contain any costabilizers, let alone the one the applicant's claimed stabilizer (wherein the nitrogen-containing costabilizer comprises at least one amino compound, amide compound, hydrazine compound, urea compound or a hindered amine) and in the amount required by the claimed invention.

Kurz focuses on resistance against diesel fuel and against gasoline while this patent application focuses on acid resistance (see claims 19, 20, and 24-27). Therefore, claims 19, 20 and 24-27 are further distinguished over Kurz. Therefore, the claimed invention is not anticipated by Kurz.

### **Obviousness Rejection**

Claims 11-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Horio in view of Takayama.

The object of the present invention was to provide polyoxymethylene compounds with high resistance in view of acids, in particular to aggressive acid-containing cleaners (see claims 19, 20 and 24-26). Acid resistant polyoxymethylene compounds can be provided if specific additives comprising polyalkylene glycol, nitrogen-containing -costabilizers which comprises at least one amino compound, amide compound, hydrazine compound, urea compound or a hindered amine, and zinc oxide are used.

The examples 5 and 8 of the present application, comprising said three additives, show the lowest loss of elongation of the material after treatment with a phosphoric acid solution.

Horio describes resin compositions with excellent extrusion moldability and anti-slip properties. The oxymethylene polymer resin composition encompass essentially sterically hindered phenol compound, a low-density polyethylene, a calcium salt of a fatty acid and a compound of a formaldehyde reactive nitrogen atom (see column 4, lines 21-37). The use of zinc oxide as inorganic pigment and the use of polyakylene glycol as lubricant is only described as possible additives.

Horio states at col. 17, lines 39-53

Examples of pigments include organic pigments and inorganic pigments. As inorganic pigments, there can be mentioned inorganic pigments conventionally used for the coloring of resins. Examples of inorganic pigments include (1) zinc sulfide, (2) **zinc oxide**, (3) titanium oxide, (4) barium sulfate, (5) Titan Yellow, (6) iron oxide, (7) ultramarine, (8) cobalt blue, (9) calcined pigments, (10) carbonate, (11) phosphate, acetate, (12) carbon black, (13) acetylene black, (14) lamp black and the like. Examples of organic pigments include a condensed (15) azo type, (16) an isoindoline type, (17) a disazo type, (18) a monoazo type, (19) an anthraquinone type, (20) a heterocyclic type, (21) a quinacridone type, (22) a thioindigo type, (23) a perylene type, (24) a dioxazine type, (25) a phthalocyanine type and the like. These pigments can be used in an amount usually employed in the art. (emphasis added)<sup>2</sup>

There are 25 pigments disclosed with zinc oxide being one out of twenty-five. None of the 16 examples use zinc oxide. The use of a combination of specific additives comprising zinc oxide, polyakylene glycol and a nitrogen containing compound to reach acid resistant polyoxymethylene compounds are not described in Horio. As the Examiner correctly stated another difference between Horio and the applicant's claimed invention is the amount of zinc

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<sup>2</sup> The numbers have been inserted by the applicant and were not in the disclosure.  
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oxide disclosed. Horio does not disclose a specific amount and just states an amount usually employed in the art. The applicant has shown the criticality of the zinc oxide by comparing comparative examples 3, 4 and 7 which have ingredients A, B and D but do not contain any zinc oxide compared to the inventive examples 5 and 8 which have ingredients A, B, C (1 % zinc oxide) and D. The addition of zinc oxide shows unexpected results.

Takayama describes polyacetal / modified olefinic polymer blends with excellent sliding properties comprising zinc oxide as inorganic filler in an amount from 0.1 to 20 parts. Takayama does not teach the preparation of acid resistant polyoxymethylene compounds (see col. 1, lines 7-9 and col. 2, lines 20-35). There is no indication that the above described combination of additives leads to said acid resistant polymers (see the applicant's claims 19, 20 and 24-27).

Therefore in view of Horio and Takayama, it was not obvious to use an additive combination comprising a polyalkylene glycol, zinc oxide and a nitrogen containing compound to provide polyoxymethylenes with improved acid resistance.

The Examiner must consider the references as a whole, In re Yates, 211 USPQ 1149 (CCPA 1981). The Examiner cannot selectively pick and choose from the disclosed multitude of parameters **without any direction** as to the particular one selection of the reference **without proper motivation**. The mere fact that the prior art may be modified to reflect features of the claimed invention does not make modification, and hence claimed invention, obvious **unless the prior art suggested the desirability of such modification** (In re Gordon, 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed. Cir. 1984); In re Baird, 29 USPQ 2d 1550 (CAFC 1994) and In re Fritch, 23 USPQ 2nd. 1780 (Fed. Cir. 1992)). In re Gorman, 933 F.2d 982, 987, 18 USPQ2d



1885, 1888 (Fed. Cir. 1991) (in a determination under 35 U.S.C. § 103 it is impermissible to simply engage in a hindsight reconstruction of the claimed invention; the references themselves must provide some teaching whereby the applicant's combination would have been obvious); In re Dow Chemical Co., 837 F.2d 469,473, 5 USPQ2d 1529, 1531 (Fed. Cir. 1988) (under 35 U.S.C. § 103, both the suggestion and the expectation of success must be founded in the prior art, not in the applicant's disclosure). The applicant disagrees with the Examiner why one skilled in the art with the knowledge of the references would selectively modify the references in order to arrive at the applicant's claimed invention. The Examiner's argument is clearly based on hindsight reconstruction.

Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention absent some teaching, suggestion, or incentive supporting this combination, although it may have been obvious to try various combinations of teachings of the prior art references to achieve the applicant's claimed invention, such evidence does not establish prima facie case of obviousness (In re Geiger, 2 USPQ 2d. 1276 (Fed. Cir. 1987)). There would be no reason for one skilled in the art to combine Horio and Takayama. For the above reasons, this rejection should be withdrawn.

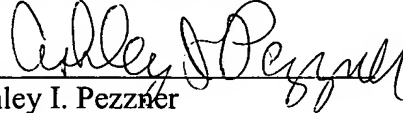
#### **Claims 19, 20 and 24-27**

Again, claims 19, 20 and 24-27 all relate to acid resistance of the molding compositions or of the molded articles obtained therefrom. The applied prior art does not address these claimed features. For these reasons, these claims are patentable.

In view of the above amendment, applicant believes the pending application is in condition for allowance.

Applicant believes no fee is due with this response. However, if a fee is due, please charge our Deposit Account No. 03-2775, under Order No. 05587-00330-US from which the undersigned is authorized to draw.

Respectfully submitted,

By   
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Attorney for Applicant

ENCLOSURES: APPENDIX 1 - DEFINITIONS OF WHITE GOODS

Application No.: 10/088656

Docket No.: 05587-00330-US

**APPENDIX 1**

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Merriam-Webster Online Dictionary

One entry found for white goods.

Main Entry: **white goods**Function: *noun plural*1 **a** : white fabrics especially of cotton or linen **b** : articles (as sheets, towels, or curtains) orig. or typically made of white cloth

2 : major household appliances (as stoves and refrigerators) that are typically finished in white enamel

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TYPE IN YOUR WORD &amp; CLICK GO!

Search:  Normal ☒ **GO****white goods**[\(Pronunciation Key\)](#)*pl.n.*

1. White fabrics, usually of cotton or linen.
2. Household merchandise, as bed sheets and curtains, formerly made from white fabrics, but now often colored.
3. Large household appliances, as ovens and refrigerators, formerly finished with white enamel, but now often colored.

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**Tube for coupling linen washing and dish washing machines to a central water system**

**Patent number:** EP1312849  
**Publication date:** 2003-05-21  
**Inventor:** RESTELLI ANDREA (IT)  
**Applicant:** RE FLEX SRL (IT)  
**Classification:**  
- **International:** F16L39/02; A47L15/42; D06F39/08  
- **European:** F16L39/02; D06F39/08B  
**Application number:** EP20020025869 20021119  
**Priority number(s):** IT2001MI00611U 20011119

**Also published as:**

EP1312849 (A3)

**Cited documents:**

EP0474569

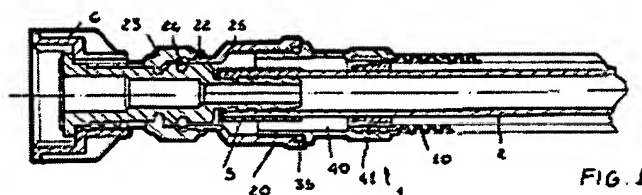
FR2596130

EP0900965

**Abstract of EP1312849**

The present invention relates to a coupling tube for coupling to a central water system linen and dish washing machines, and other white goods in general, comprising an inner tube element (2) coupled, at the end portions thereof, to a rubber holder fitting (3) and an outer protective tube element (10) defining, in cooperation with said inner tube element (2), a tightly closed gap.

The main feature of the invention is that the coupling tube comprises moreover, at least at one end portion of the tube, a covering casing (20), defining a chamber (40) inside which an indicating or signalling element (41) is movable, as urged by the pushing force of the liquid possibly present in said gap because of the failure of the inner tube element (2).



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**EP 1 312 849 A2**

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## EUROPEAN PATENT APPLICATION

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21.05.2003 Bulletin 2003/21

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(30) Priority: 19.11.2001 IT MI20010611 U

(71) Applicant: **RE-FLEX S.r.l.**  
**21049 Tradate (Varese) (IT)**

(54) **Tube for coupling linen washing and dish washing machines to a central water system**

(57) The present invention relates to a coupling tube for coupling to a central water system linen and dish washing machines, and other white goods in general, comprising an inner tube element (2) coupled, at the end portions thereof, to a rubber holder fitting (3) and an outer protective tube element (10) defining, in cooperation with said inner tube element (2), a tightly closed gap.

The main feature of the invention is that the coupling tube comprises moreover, at least at one end portion of the tube, a covering casing (20), defining a chamber (40) inside which an indicating or signalling element (41) is movable, as urged by the pushing force of the liquid possibly present in said gap because of the failure of the inner tube element (2).

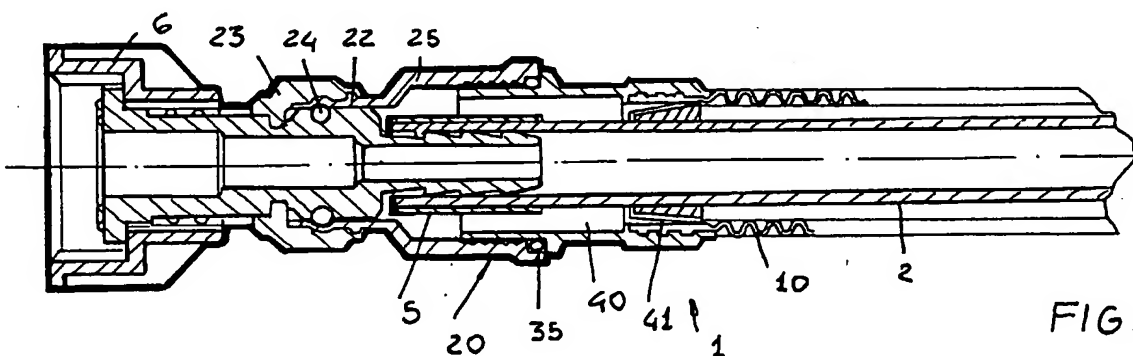


FIG. 1

EP 1 312 849 A2

## Description

### BACKGROUND OF THE INVENTION

[0001] The present invention relates to a tube for coupling linen washing and dish washing machines to a central water system.

[0002] Protected tubes for coupling to a central water system linen and dish washing machines are already known.

[0003] Said coupling tubes generally comprise an inner tube element, thereon is applied a sheath including means adapted to form, with the inner tube element, a tightly sealed gap.

[0004] The outer sheath is usually made of an optically transparent or clear material.

[0005] The surface of the inner tube element is so designed that the presence of water in said gap enhances the color thereof, to better show an occurred leakage.

[0006] While the above mentioned approach has been found as satisfactory, it, in some cases, does not allow to clearly display a breakage, in particular as water fully fills said gap.

[0007] Actually, with a fully filled gap, it is not possible to obtain an immediate optical variation, allowing to clearly see from the outside the presence of water in said gap.

### SUMMARY OF THE INVENTION

[0008] Accordingly, the aim of the present invention is to overcome the above mentioned problem, by providing a tube for coupling to a central water system linen and dish washing machines, allowing to immediately display the presence of water in a gap defined by an inner tube element and an outer sheath, to allow an operator to immediately intervene.

[0009] Within the scope of the above mentioned aim, a main object of the present invention is to provide such a tube which can be coupled to the washing machine and water system by conventional coupling methods, while providing very improved coupling characteristics.

[0010] Another object of the present invention is to provide such a coupling tube, which, owing to its specifically designed construction, is very reliable and safe in operation.

[0011] Yet another object of the present invention is to provide such a coupling tube which can be easily made starting from easily available elements and materials, and which, moreover, is very competitive from a mere economic standpoint.

[0012] According to one aspect of the present invention, the above mentioned aim and objects, as well as yet other objects, which will become more apparent hereinafter, are achieved by a tube for coupling linen and dish washing machines to a central water system, comprising an inner tube element coupled, at the end portions thereof, to a rubber holder fitting and to an outer

protective tube defining, in cooperation with said inner tube element, a tightly closed gap, characterized in that said coupling tube further comprises, at least at one end portion of said tube element, a covering casing defining a casing chamber, inside which an indicating element is movable, said indicating element being driven by the pushing force provided by the liquid present in said gap, as said inner tube element fails.

### BRIEF DESCRIPTION OF THE DRAWINGS

[0013] Further characteristics and advantages of the present invention will become more apparent hereinafter from the following detailed disclosure of a tube for coupling to a central water system white goods in general, in particular linen and dish washing machines, which is illustrated, by way of an indicative, but not limitative, example, in the figures of the accompanying drawings, where:

Figure 1 is a longitudinal cross-sectional view illustrating the coupling tube according to the present invention;

Figure 2 illustrates, on an enlarged scale, a detail of the covering casing and indicating element; and

Figure 3 illustrates the end portion of the coupling tube exposed to the view.

### DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0014] With reference to the number references of the above mentioned figures, the coupling tube for coupling to a water system white goods in general, and linen and dish washing machines in particular, which has been generally indicated by the reference number 1, comprises an inner tube element 2, which, at its end portions, is coupled to a rubber holder fitting 3 and, in a per se known manner, being provided with an inlet 4 thereon is arranged a tube clamping bush 5, for coupling at the end thereof the inner tube element 2.

[0015] At the other end portion thereof, the fitting 3 is coupled, in a per se known manner, to a clamping ring nut 6.

[0016] On the outside of the inner tube element 2, is provided an outer tube element 10, or protective sheath, which, in cooperation with the tube element 2, defines a gap 11 which is outwardly tightly closed.

[0017] The main feature of the invention is that, at least at one portion of the tube 1, is provided a covering casing, which has been generally indicated by the reference number 20.

[0018] The covering casing 20 comprises a first half-body 21, generally colored, having an end-piece 22 on which is provided an overmolding portion 23 for coupling to the fitting 3.

[0019] A sealing O-ring 24 is moreover provided for

tightly coupling the fitting and the end piece 22.

[0020] In particular the end piece 22, comprises a tapering portion 25 with an inner thread 26 which can be coupled with the male thread 27 of a second half-body 30, which is advantageously made of a clear or transparent material and is overmolded at the end portion of the outer protective tube element 10.

[0021] The casing 20 which, at its connecting region is provided with a sealing O-ring 35, defines an inner chamber 40, in which an indicating or signalling element 41 can be driven.

[0022] In particular, said indicating element 41 is driven by a pushing force of the liquid possibly present in the gap 11 because of a failing of the inner tube element.

[0023] The signalling or indicating element 41, in particular, is constituted by an annular band, which is tightly movable on the inner tube element 2.

[0024] Said signalling or indicating element 41, in a regular or normal operation condition, will be arranged at a protected region inside the outer tube element 10 which is advantageously colored and, because of this reason, cannot be seen from outside.

[0025] If a liquid leak occurs, as is shown in figure 3, then a pushing force will be generated, tending to drive the indicating element 41, which is advantageously formed with a rectangular trapezium cross section at the visible clear band 42 of the half-body 30, thereby it can be easily seen from outside.

[0026] The signalling or indicating element 41 is advantageously colored with a red color.

[0027] Thus, a leak occurring as the tube fails, will generate a pushing force on the indicating element, which will be driven so as to immediately make the failure visible, with a consequent possibility of performing immediate repairing operations.

[0028] In practicing the invention, the used materials, provided that they are compatible to the intended application, and the contingent size and shaped, can be any, depending on requirements.

## Claims

1. A tube for coupling linen and dish washing machines to a central water system, comprising an inner tube element coupled, at the end portions thereof, to a rubber holder fitting and to an outer protective tube defining, in cooperation with said inner tube element, a tightly closed gap, **characterized in that** said coupling tube further comprises, at least at one end portion of said tube element, a covering casing defining a casing chamber, inside which an indicating element is movable, said indicating element being driven by the pushing force provided by the liquid present in said gap, as said inner tube element fails.
2. A coupling tube, according to the preceding claim,

**characterized in that** said covering casing comprises a first and second casing half-bodies, which can be tightly coupled to one another.

3. A tube, according to one or more of the preceding claims, **characterized in that** said first half-body is coupled to said fitting by an overmolded portion, and said second half-body is overmolded with respect to the outer tube element.
4. A tube, according to one or more of the preceding claims, **characterized in that** said first half-body is provided with a tapering portion having a female thread, which can be coupled to a male thread defined by said second half-body.
5. A tube, according to one or more of the preceding claims, **characterized in that** said second half-body comprises at least an optically transparent portion at a position assumed by the indicating element as the inner tube element fails.
6. A tube, according to one or more of the preceding claims, **characterized in that** said indicating element comprises an annular body which can be tightly driven on the inner tube element.
7. A tube, according to one or more of the preceding claims, **characterized in that** said annular body is colored in a red color.
8. A tube, according to one or more of the preceding claims, **characterized in that** said outer tube element is made of a colored material.
9. A tube, according to one or more of the preceding claims, **characterized in that** said annular body has a rectangular trapezium shaped cross-section.
10. A tube for coupling to a central water system white goods in general, and linen and dish washing machines in particular, including specifically designed structural elements, according to one or more of the preceding claims, and substantially as broadly disclosed and illustrated and for the intended aim and objects.

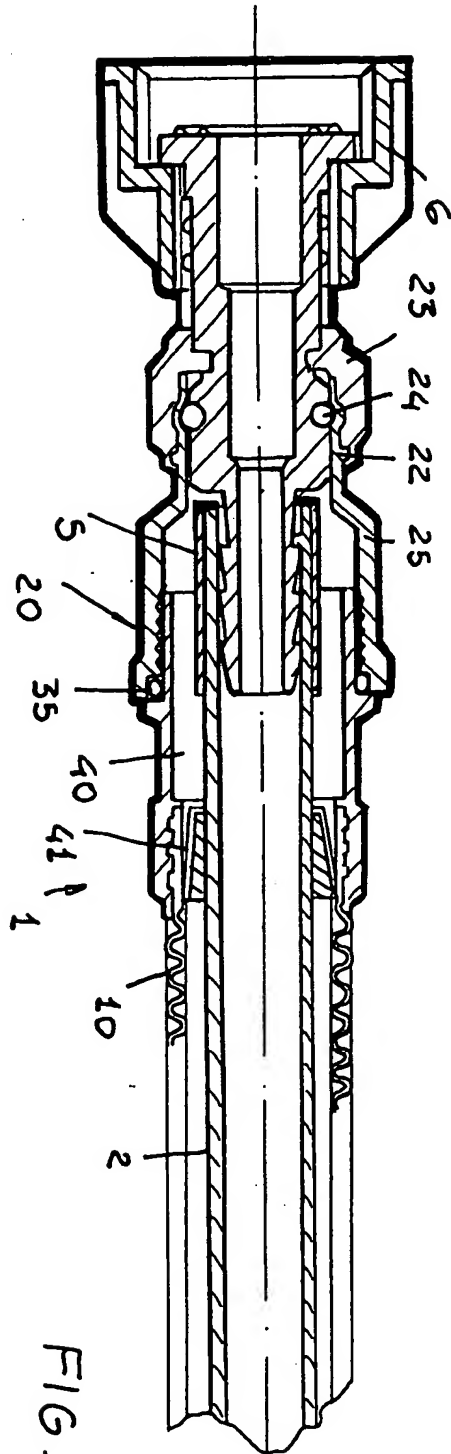


FIG. 1

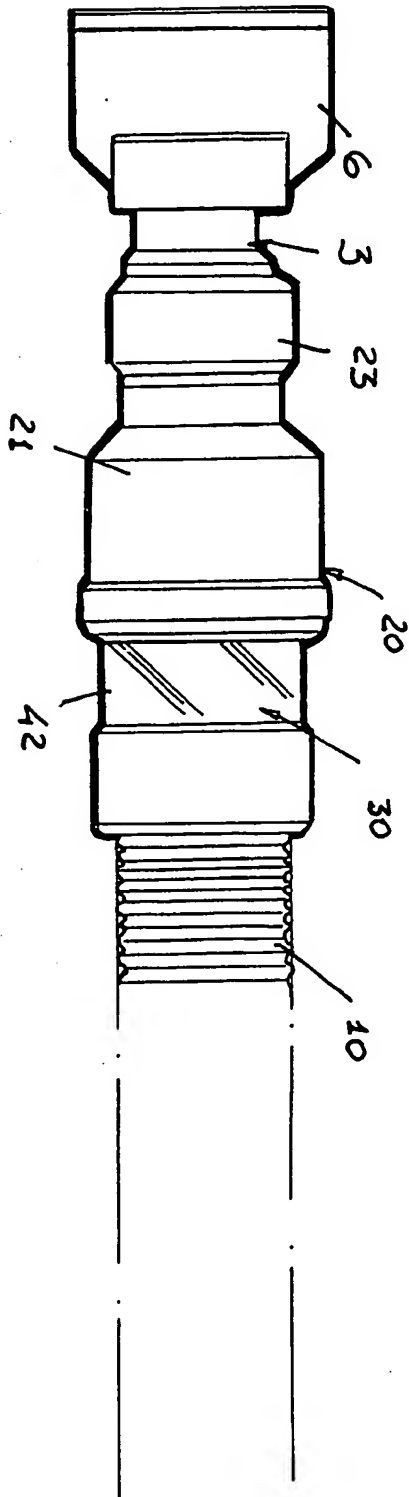
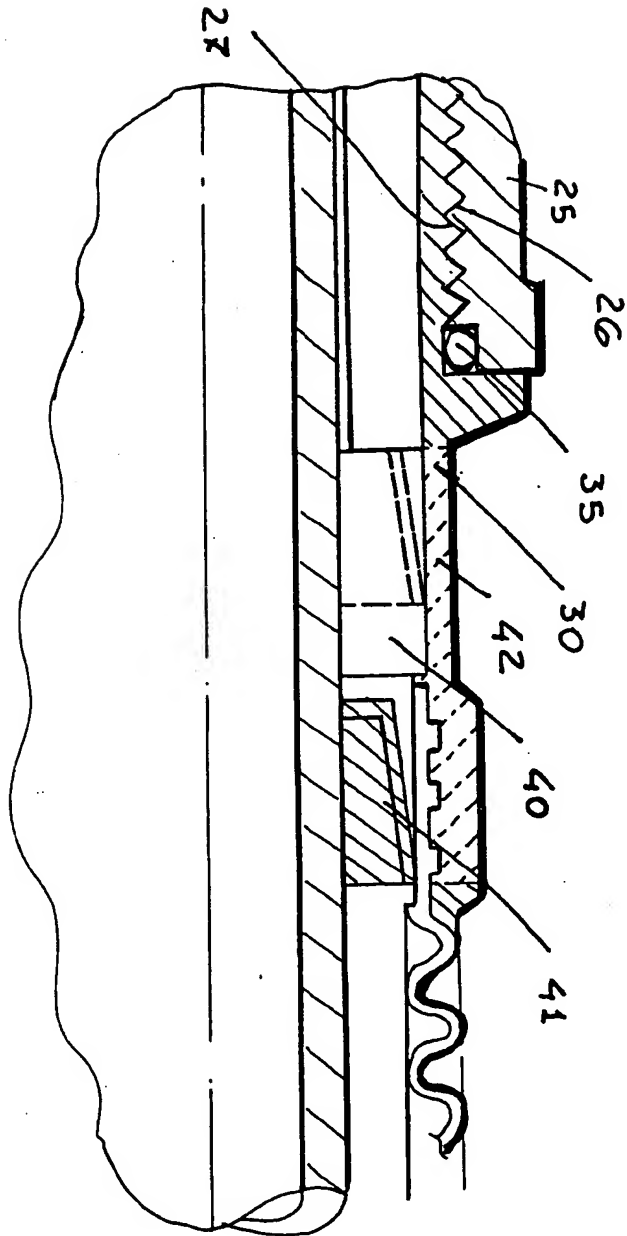


FIG. 3

FIG. 2



(19)



Europäisches Patentamt  
European Patent Office  
Office européen des brevets



(11)

**EP 1 312 849 A3**

(12)

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(54) **Tube for coupling linen washing and dish washing machines to a central water system**

(57) The present invention relates to a coupling tube for coupling to a central water system linen and dish washing machines, and other white goods in general, comprising an inner tube element (2) coupled, at the end portions thereof, to a rubber holder fitting (3) and an outer protective tube element (10) defining, in cooperation with said inner tube element (2), a tightly closed gap.

The main feature of the invention is that the coupling tube comprises moreover, at least at one end portion of the tube, a covering casing (20), defining a chamber (40) inside which an indicating or signalling element (41) is movable, as urged by the pushing force of the liquid possibly present in said gap because of the failure of the inner tube element (2).

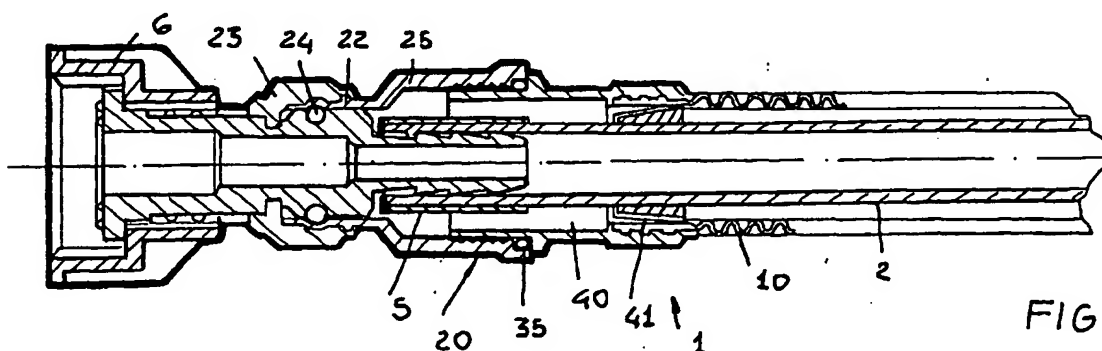


FIG. 1

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European Patent  
Office

# PARTIAL EUROPEAN SEARCH REPORT

Application Number

which under Rule 45 of the European Patent Convention EP 02 02 5869  
shall be considered, for the purposes of subsequent  
proceedings, as the European search report

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION. (Int.Cl.7)
X	EP 0 474 569 A (EATON SA MONACO) 11 March 1992 (1992-03-11) * column 2, line 55 - column 3, line 5 * * column 4, line 56 - column 5, line 13 * * figures *	1-9	F16L39/02 A47L15/42 D06F39/08
X	FR 2 596 130 A (SOCADO) 25 September 1987 (1987-09-25) * page 3, line 17-21 * * figures *	1	
A	EP 0 900 965 A (RE FLEX SRL) 10 March 1999 (1999-03-10) * the whole document *	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			F16L A47L D06F
INCOMPLETE SEARCH			
<p>The Search Division considers that the present application, or one or more of its claims, does/do not comply with the EPC to such an extent that a meaningful search into the state of the art cannot be carried out, or can only be carried out partially, for these claims.</p> <p>Claims searched completely :</p> <p>Claims searched incompletely :</p> <p>Claims not searched :</p> <p>Reason for the limitation of the search:</p> <p>see sheet C</p>			
Place of search <b>MUNICH</b>		Date of completion of the search <b>10 April 2003</b>	Examiner <b>Durrenberger, X</b>
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons &amp; : member of the same patent family, corresponding document</p>			

EPO FORM 1503 03.02 (P/04C07)





European Patent  
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**INCOMPLETE SEARCH  
SHEET C**

Application Number  
EP 02 02 5869

Claim(s) searched completely:  
1-9

Claim(s) not searched:  
10

Reason for the limitation of the search:

Claim 10 only contains a broad and vague reference to the description and the drawings. According to Rule 29(6) EPC, claims should not contain such reference. Moreover, due to this broad and vague reference, the subject of claim 10 is not defined (Article 84 EPC).

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 02 02 5869

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on  
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



10-04-2003

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EP 0900965	A	10-03-1999	IT	M1970633 U1	03-03-1999
			EP	0900965 A2	10-03-1999
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**MULTIFUNCTIONAL HOUSING**

**Patent number:** WO2004026012  
**Publication date:** 2004-03-25  
**Inventor:** SCHEWE HERBERT (DE); BRABEC CHRISTOPH (DE)  
**Applicant:** SCHEWE HERBERT (DE); SIEMENS AG (DE); BRABEC CHRISTOPH (DE)  
**Classification:**  
- international: H05K5/02  
- european: H05K5/02E  
**Application number:** WO2003DE02942 20030904  
**Priority number(s):** DE20021041206 20020905

**Cited documents:**

 FR2821233  
 US6349221  
 GB2369521  
 EP1017209  
 EP1079584  
more >>

**Abstract of WO2004026012**

The invention relates to a multifunctional housing for so-called white/grey goods, in particular an electrical domestic appliance, a consumer electronic product, including mobile devices such as mobile telephones etc and/or a bulky device, for example from the medical, power generating plant, or the automobile sphere. The optional colours are already an improvement over existing possibilities, but in particular, the combinations made possible by the inclusion of various sensors and/or energy supplies such as solar cells are particularly advantageous.

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(12) NACH DEM VERTRAG ÜBER DIE INTERNATIONALE ZUSAMMENARBEIT AUF DEM GEBIET DES  
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(21) Internationales Aktenzeichen: **PCT/DE2003/002942**

(22) Internationales Anmeldedatum:  
4. September 2003 (04.09.2003)

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(30) Angaben zur Priorität:  
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— mit internationalem Recherchenbericht

(71) Anmelder (für alle Bestimmungsstaaten mit Ausnahme von  
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Zur Erklärung der Zweibuchstaben-Codes und der anderen Ab-  
kürzungen wird auf die Erklärungen ("Guidance Notes on Co-  
des and Abbreviations") am Anfang jeder regulären Ausgabe der  
PCT-Gazette verwiesen.

(72) Erfinder; und

(75) Erfinder/Anmelder (nur für US): **BRABEC, Christoph**

(54) Title: **MULTIFUNCTIONAL HOUSING**

(54) Bezeichnung: **MULTIFUNKTIONELLES GEHÄUSE**

(57) Abstract: The invention relates to a multifunctional housing for so-called white/grey goods, in particular an electrical domestic appliance, a consumer electronic product, including mobile devices such as mobile telephones etc and/or a bulky device, for example from the medical, power generating plant, or the automobile sphere. The optional colours are already an improvement over existing possibilities, but in particular, the combinations made possible by the inclusion of various sensors and/or energy supplies such as solar cells are particularly advantageous.

(57) Zusammenfassung: Die Erfindung betrifft ein multifunktionelles Gehäuse für die sogenannte Weiss/Grau Ware, insbesondere ein elektrisches Hausgerät, ein Gerät der Consumerelektronik, inklusive der mobilen Geräte wie Handys etc. und/oder ein Grossgerät, beispielsweise aus dem Medizinbereich, Kraftwerksbereich oder Automobilbereich. Zunächst ist die veränderbare Farbgebung des Gehäuses schon eine Verbesserung zu den bestehenden, aber insbesondere die möglichen Kombinationen, die durch die Einbeziehung verschiedener Sensoren und/oder von Energiequellen wie Solarzellen möglich wird, sind besonders vorteilhaft.

WO 2004/026012 A1

## Beschreibung

### Multifunktionelles Gehäuse

Die Erfindung betrifft ein Gehäuse für die sogenannte Weiss/Grau Ware, insbesondere ein elektrisches Hausgerät, ein Gerät der Consumerelektronik, inklusive der mobilen Geräte wie Handys etc. und/oder ein Großgerät, beispielsweise aus dem Medizinbereich, Kraftwerksbereich oder Automobilbereich .

Bekannt sind Gehäuse, die ausgewechselt werden können, so dass beispielsweise Farbeffekte des Gehäuses verändert und den Bedürfnissen des Besitzers angepasst werden können. Nachteilig daran ist, dass die Gehäuse immer nur eine Farbe zeigen und ansonsten keine Funktionen erfüllen.

Es besteht jedoch der Bedarf, Gehäuse zu schaffen, deren Farbe beliebig wechselt und/oder die funktionell sind.

Aufgabe der Erfindung ist daher ein Gehäuse zu schaffen, das mehrere Funktionen erfüllen kann und Farbveränderungen ohne Austausch fester Teile zeigt.

Gegenstand der Erfindung ist ein Gehäuse, das einen festen Grundkörper umfasst, das zumindest in Teilbereichen mit einer Folie beschichtet ist, wobei die Folie als Substrat dient, auf dem zumindest ein elektronisches Bauelement aufgebaut ist.

Nach einer Ausführungsform ist das elektronische Bauelement eine elektrochemische Zelle, wobei die Dotierung des Farbstoffes eine Veränderung der Farbe des elektrochemischen Bauelements bewirkt. Üblicherweise wird dabei der Aufbau einer elektrochemischen Zelle verwendet, der eine Elektrode, den jeweiligen elektrochromen Farbstoff, den Elektrolyten und eine Gegenelektrode umfasst, wobei eine Verkapselung zwischen den beiden Elektroden sinnvoll ist, um einen Verlust des

## 2

Elektrolyten zu vermeiden. Die Dotierung des elektrochromen Farbstoffes erfolgt durch Anlegen einer Spannung, wodurch bewirkt wird, dass die Ionen des Elektrolyten in den Farbstoff eindiffundieren und diesen oxidieren oder reduzieren. Beschichtet man ein Gehäuse mit solch einer elektrochromen Folie, so lässt sich durch Anlegen einer geringen Spannung die Farbe des Gehäuses ändern. Die Änderung der Farbe ist bevorzugt reversibel.

Nach einer weiteren Ausführungsform ist ein elektronisches Bauelement eine photovoltaische Zelle, beispielsweise eine Solarzelle. Insbesondere die Anwendung organischer oder zumindest vorwiegend aus organischen Materialien aufgebauter Solarzellen ist dabei interessant, da die Solarzelle, übrigens auch bei schwachem Raumlicht, genügend elektrische Leistung liefert, um die elektrochrome Farbe zu schalten.

Nach einer anderen Ausführungsform ist ein elektronisches Bauelement beispielsweise ein Photodetektor, der das Umgebungslicht, (Intensität und/oder Farbe) detektieren kann und die Farbe der Folie und damit des beschichteten Teils des Gehäuses je nach Umgebungsbedingungen umschaltet.

Nach weiteren Ausführungsformen können verschiedenen elektronische Bauelemente, die verschiedene Sensorik umfassen, auf der Folie aufgebaut sein. So können Gas-, Temperatur-, Feuchtigkeits-, und/oder weitere Sensoren eingesetzt werden, um über das Gehäuse Informationen bezüglich verschiedener Umgebungsbedingungen zu liefern. So kann zukünftig am Gehäuse die aktuelle Umweltsituation, in der es sich befindet, abgelesen werden. Dies trifft insbesondere auch für Strahlen- (UV, Röntgen, Radioaktivität) und/oder Luft- (Ozon) und/oder für sonstige mittels Sensoren feststellbare Belastungen zu.

Als Beispiele für einsetzbare elektrochrome Farbsysteme können folgende Verbindungen genannt werden: Polyaniline (PANI), PEDOT oder Derivate davon, Vinologene oder weitere konjugier-

te polymere oder molekulare Farbsysteme, die Ihren Farbzustand bei Oxidation oder Reduktion verändern.

Der feste Grundkörper des Gehäuses ist aus den bislang für solche Gehäuse üblichen Kunststoffen wie PVC, PE, etc.

Als „Gehäuse“ werden hier nicht nur traditionell Gehäuse benannte Körper bezeichnet, sondern auch Kleidungsstücke und/oder Teile von Fahrzeugen oder anderes. Bevorzugte Gehäuse sind die von Telefonen, insbesondere von Mobiltelefonen, Walk-man-Geräten, aber auch Helme, Fahrradbleche, Autochassis etc..

Die Folie, die als Substrat für das elektronische Bauelement dient ist bevorzugt eine flexible Folie wie beispielsweise PET, PMMA, PC, Polyimid....

Die elektronischen Bauelemente sind bevorzugt solche, die vorwiegend aus organischem Material aufgebaut sind, wobei der Begriff „organisches Material“ oder „Funktionspolymer“ oder „Polymer“ hier alle Arten von organischen, metallorganischen und/oder organisch-anorganischen Kunststoffen (Hybride), insbesondere die, die im Englischen z.B. mit „plastics“ bezeichnet werden, umfasst. Es handelt sich um alle Arten von Stoffen mit Ausnahme der Halbleiter, die die klassischen Dioden bilden (Germanium, Silizium), und der typischen metallischen Leiter. Eine Beschränkung im dogmatischen Sinn auf organisches Material als Kohlenstoff-enthaltendes Material ist demnach nicht vorgesehen, vielmehr ist auch an den breiten Einsatz von z.B. Siliconen gedacht. Weiterhin soll der Term keiner Beschränkung im Hinblick auf die Molekülgröße, insbesondere auf polymere und/oder oligomere Materialien unterliegen, sondern es ist durchaus auch der Einsatz von „small molecules“ möglich. Der Wortbestandteil „polymer“ im Funktionspolymer ist historisch bedingt und enthält insofern keine Aussage über das Vorliegen einer tatsächlich polymeren Verbindung.

Als Funktionspolymer können halbleitende, leitende und/oder isolierende Stoffe gemeint sein.

Vorwiegend aus organischem Material gebildete elektronische Bauelemente zeichnen sich dadurch aus, dass sie in der Regel auf flexiblen Substraten aufgebaut werden können. Die einzelnen Funktionsschichten wie Leiter, Halbleiter, Isolator, emittierende Schicht, photovoltaisch aktive Schicht etc. sind dabei aus vorwiegend organischem Material. Durch die Löslichkeit des organischen Materials sind diese Bauelemente oft durch Drucken und/oder in einfachen Rolle zu Rolle Verfahren herstellbar.

Mit der Erfindung wird es erstmals möglich, auch ein Gehäuse in die Funktionalität des Gerätes miteinzubeziehen, das heißt durch die Gestaltung und Wirkung des Gehäuses einen zusätzlichen wirtschaftlichen Wert zu schaffen. Dabei ist allein die veränderbare Farbgebung des Gehäuses schon eine Verbesserung aber insbesondere die möglichen Kombinationen, die durch die Einbeziehung verschiedener Sensoren und/oder von Energiequellen wie Solarzellen möglich wird, besonders vorteilhaft.



## Patentansprüche

1. Gehäuse, das einen festen Grundkörper umfasst und zumindest in Teilbereichen mit einer Folie beschichtet ist, wobei die Folie als Substrat dient, auf dem zumindest ein elektronisches Bauelement aufgebaut ist.
2. Gehäuse nach Anspruch 1, wobei zumindest ein elektronisches Bauelement ein elektrochromes Farbsystem umfasst.
3. Gehäuse nach Anspruch 2, wobei das elektrochrome Farbsystem eine reversible Änderung der Gehäusefarbe bewirkt.
4. Gehäuse nach einem der vorstehenden Ansprüche, wobei zumindest ein elektronisches Bauelement eine photovoltaische Zelle, wie eine Solarzelle, einen Photodetektor oder ähnliches umfasst.
5. Gehäuse nach einem der vorstehenden Ansprüche, wobei zumindest ein elektronisches Bauelement einen Sensor umfasst.
6. Gehäuse nach einem der vorstehenden Ansprüche, wobei das elektronische Bauelement vorwiegend aus organischem Material aufgebaut ist.

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/DE 03/02942

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H05K5/02

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H05K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	FR 2 821 233 A (F & W AG) 23 August 2002 (2002-08-23) the whole document ---	1-6
X	US 6 349 221 B1 (WOLF MATS ERIK ET AL) 19 February 2002 (2002-02-19) the whole document ---	1-6
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A		2
X	EP 1 017 209 A (NOKIA MOBILE PHONES LTD) 5 July 2000 (2000-07-05) the whole document ---	1
	--- -/-	

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

## \* Special categories of cited documents:

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"Z" document member of the same patent family

Date of the actual completion of the International search

1 December 2003

Date of mailing of the International search report

10/12/2003

Name and mailing address of the ISA

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# INTERNATIONAL SEARCH REPORT

International Application No

PCT/DE 03/02942

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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## INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

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## A. KLASSTIFIZIERUNG DES ANMELDUNGSGEGENSTANDES

IPK 7 H05K5/02

Nach der Internationalen Patentklassifikation (IPK) oder nach der nationalen Klassifikation und der IPK

## B. RECHERCHIERTE GEBIETE

Recherchiertes Mindestprüfstoff (Klassifikationssystem und Klassifikationssymbole)

IPK 7 H05K

Recherchierte aber nicht zum Mindestprüfstoff gehörende Veröffentlichungen, soweit diese unter die recherchierten Gebiete fallen

Während der internationalen Recherche konsultierte elektronische Datenbank (Name der Datenbank und evtl. verwendete Suchbegriffe)

EPO-Internal

## C. ALS WESENTLICH ANGESEHENE UNTERLAGEN

Kategorie*	Bezeichnung der Veröffentlichung, soweit erforderlich unter Angabe der in Betracht kommenden Teile	Betr. Anspruch Nr.
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Weitere Veröffentlichungen sind der Fortsetzung von Feld C zu entnehmen



Siehe Anhang Patentfamilie

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## INTERNATIONALER RECHERCHENBERICHT

Int lionales Aktenzeichen

PCT/DE 03/02942

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